CLAIMS

1. A method comprising:

changing the gain of an amplifier in a gain stage of a sensor in response to a signal read out from a pixel array in the sensor; and

changing the power consumption of the amplifier in the gain stage in response to changing the gain.

2. The method of claim 1, wherein said changing the power consumption comprises changing a transconductance of an input transistor in the amplifier.

3. The method of claim 1, wherein said changing the power consumption comprises:

decreasing the power consumption in response to a decrease in the gain; and

increasing the power consumption in response to an increase in the gain.

4. The method of claim 1, further comprising:

associating a plurality of power consumption settings with a plurality of gain settings;

selecting a gain setting from said plurality of gain settings; and

selecting a power consumption setting associated with the selected gain setting.

5. The method of claim 4, wherein the gain setting is selected from eight gain settings.

6. The method of claim 5, wherein the power consumption setting is selected from three power consumption settings, each of three power consumption settings being associated with a different plurality of gain settings.

7. The method of claim 4, wherein each of the plurality of gain settings is associated with a different one of the plurality of power consumption settings.

8. A method comprising:

selecting one of a plurality of gain settings in response to a signal read out from a pixel array in a sensor;

generating two or more bias currents having bias current values associated with the selected gain setting; and

applying said two or more bias currents to a plurality of parallel transistors in an amplifier in a gain stage of the sensor in order to change the input transconductance of the amplifier.

9. The method of claim 8, further comprising associated each of a plurality of input transconductance settings to a plurality of gain settings, each input transconductance setting being associated with a given set of bias current values.

10. The method of claim 8, further comprising associating an input transconductance settings to each of a plurality of gain settings, each input transconductance setting being associated with a given set of bias current values.

11. An apparatus comprising:

a gain stage for a sensor, said gain stage having a differential amplifier including

a gain selector operative to select one of a plurality of gain settings in response to a signal from a pixel array,

an input transistor having a variable input transconductance, and

a transconductance controller operative to select an input transconductance of the input transistor in response to a selected gain setting.

12. The apparatus of claim 11, wherein the transconductance controller is operative to select an input transconductance setting associated with the selected gain setting from a plurality of input transconductance settings.

13. The apparatus of claim 11, wherein the input transistor comprises:

a first plurality of parallel transistors connected to a first bias current supply; and

a second plurality of parallel transistors connected to a second bias current supply.

14. The apparatus of claim 13, wherein the transconductance controller comprises:

a bias current selector operative to select values for first bias current and a second bias current associated with a selected gain setting, and

a bias current generator operative to generate a current having the selected value for the first bias current and apply said current to the first bias current supply and to generate a current having the selected value for the second bias current value and apply said current to the second bias current supply.

15. The apparatus of claim 14, wherein each set of current values produces a different input transconductance.

16. The gain stage of claim 14, wherein the gain selector includes a plurality of switches and is operative to select a different set of switches for each of said plurality of gain settings.

17. The gain stage of claim 16, wherein the bias current selector is operative to select a set of current values in response to the switches selected by the gain decoder.

18. A sensor comprising:

a pixel array comprising a plurality of pixels arranged in rows and columns;

a read-out section operative to read out signals generated by pixels in the pixel array;

a gain stage having a differential amplifier including

a gain selector operative to set the differential amplifier to one of a plurality of gain settings in response to a pixel signal read out from the pixel array,

an input transistor having an input transconductance and including a first plurality of parallel transistors connected to a first bias current supply and a second plurality of parallel transistors connected to a second bias current supply, and

a transconductance controller operative to change the transconductance of the input transistor to match a selected gain setting by selectively applying different bias currents to at least one of said first and second bias current supplies for different gain settings.

19. The sensor of claim 18, wherein the transconductance controller comprises:

a gain decoder operative to select one or more bias current values in response to a selected gain response from a plurality of bias current values; and

a bias generator operative to generate and apply said one or more bias current values to at least one of the first and second bias current supplies.

20. The sensor of claim 18, wherein the transconductance controller is operative to increase the transconductance of the input transistor in response to an increase in the gain of the differential amplifier and to decrease the transconductance of the input transistor in response to a decrease in the gain of the differential amplifier.

21. The sensor of claim 18, wherein the sensor is an active pixel sensor (APS).

22. A method comprising:

changing the gain of an amplifier in a gain stage of a sensor in response to a signal read out from a pixel array in the sensor; and

changing a gain bandwidth (GBW) of the amplifier in the gain stage in response to changing the gain.

23. The method of claim 22, wherein said changing the GBW comprises changing a transconductance of an input transistor in the amplifier.

24. The method of claim 23, wherein said changing the GBW comprises:

decreasing the GBW in response to a decrease in the gain; and

increasing the GBW in response to an increase in the gain.

25. The method of claim 22, further comprising changing the root mean square (RMS) noise at an output of the amplifier in response to changing the GBW.

26. The method of claim 25, wherein said changing the RMS noise comprises:

decreasing the RMS noise in response to a decrease in the GBW; and

increasing the RMS noise in response to an increase in the GBW.